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ABSTRACT

This paper focuses on the implications of the Level 1 Technology curriculum for children in Australia. In theory, the outcomes in the curriculum profile could provide useful learning experiences. However, undue emphasis is placed on the designing, making, and appraising components, which have the potential to push young children beyond their state of readiness to learn into a state of perceived inadequacy. The activity of making a sun hat is used as an example that incorporates inappropriate materials for the task and lacks differentiation between the children's stages of development. Teachers should first establish children's developmental level in order to design appropriate learning activities and place learning within the zone of proximal development. There are several phases in the creative process: (1) exploration of the medium, involving introductions to the materials to be used; (2) developing and refining concepts and techniques through making a completed object; (3) developing autonomy in which children identify their own challenges and work through the process using the skills and knowledge about the medium and equipment they gained earlier. As one of the eight key learning areas of the National Curriculum, Technology has the potential to help children develop if it is used correctly. (Contains 5 references.) (KDFB)

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TECHNOLOGY IN THE FIRST YEARS OF SCHOOL - A PLEA FOR A CHILD CENTRED APPROACH

PAPER 54

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TECHNOLOGY IN THE FIRST YEARS OF SCHOOL - A PLEA FOR A CHILD CENTRED APPROACH

Introduction

Imagine that you have enrolled in an Adult Education woodwork class for beginners. It is something you have always wanted to do, and have few qualms. You trust the instructor to provide an appropriate structure to guide you through a process which you have never attempted before. On arriving at the first class you are given the following challenge:

> Imagine that you have moved into a new house but have no furniture, and can't afford to buy any. Make a chair from the pieces of timber and fabric lying around in the shed at the back of the house.

You are incensed. How can you make a chair without any guidance on appropriate materials, tools or design? The instructor says that it will help him (*sic*) to sort out those with ability and experience, and those who need remedial help. When you find yourself in the remedial class how do you feel?

This may seem far-fetched, but it could be a useful metaphor for understanding what we believe could be a parallel situation facing Early Childhood students if teachers implement some of the suggested applications of the Technology Curriculum. It is our concern about the implications of Level 1 Technology curriculum for children in their early years of school which is the focus of this paper.

Children often develop the idea that when they are presented with new materials they should make something successfully the very first time. This notion usually comes from adults who in turn are influenced in their expectations by books such as the kind published by *The Womens Weekly* and the How- to -do- it- Books where projects are suggested and often described in a step- by step manner with the expectation that the outcome will be successful. In our opinion, this is a very misleading view and bears little or no relationship with the way the creative process really works.

It appears that the emphasis which seems to be placed on the **design, make and appraise** Strand of the Technology curriculum, which has the potential to push young children beyond their state of readiness to learn to a state of perceived inadequacy. While, in theory, the Table of outcomes for Level 1 in the curriculum profile, could provide useful learning experiences for young children, particularly the **information, materials and systems** components, the reality seems to be different.

OHPT:

INFORMATION

Identifies different ways information can be used and presented.

Uses simple techniques to access, record and present information.

MATERIALS
Identifies common materials and some of their uses;
Uses equipment to manipulate and process common materials.

SYSTEMS
Identifies some common systems and their uses
Carries out short sequence of steps to operate or assemble systems.

DESIGN, MAKE AND APPRAISE
Investigates the form and identifies the uses of everyday products.
Generates ideas for own designs using trial and error, simple models and drawings.
Undertakes simple production processes with care and safety.
Describes feelings about own design ideas, products and processes.

(Curriculum Corporation 1994)

It is of concern to us that when it comes to the "doing" of Technology, undue emphasis is being placed on the **designing making and appraising** components, and one example, provided in the recent publication *Using the Technology Profile* (1995), may be an example of this. The example, ostensibly under the Strand of Materials/nature, asks the children to make a sunhat.

OHPT: The Sunhat brief

This brief does not appear to take into consideration either the appropriateness of the material for the intended outcome, or the task for the children, particularly if the individual differences in student development at that age are taken into consideration. The example provided, the making of a sun hat, is of particular concern for at least two reasons: First, the inappropriateness of materials to the task, and second, an apparent lack of differentiation between the stages of development of the children. From the student responses used as examples, a range of developmental stages are exhibited.

a) **Inappropriateness of materials to task .** Children should be provided with materials which adults would normally use in the production of any item. For example: when would an adult make a sunhat from aluminium. foil, cling wrap or cardboard? The long term purpose of the learning experience is unclear. If the emphasis was to be on the use of aluminium foil, cling wrap and cardboard then the task should have been one that usually involves the use of these materials, otherwise , in our opinion, the learning experience is pointess. If however the focus was on the construction of some

article which would provide the children with protection from the sun, then the materials could have been fabrics of various kinds and natural fibres such as flax leaves, palm leaves and raffia.

Another example of a technology task which encourages the use of inappropriate materials which is promoted by the Curriculum Corporation is :
' Discover that foam meat trays are an alternative to cardboard for making a telephone'(!) (Technology Profile, 1994, 21)

b) Lack of differentiation between stages of development of the children in setting the same task for all children.
If all children are given the same task of making a hat from these materials, it makes sense that some children will achieve this task easily, some will struggle and some will be frustrated. Is it wise that the Technology Profiles suggest that a common learning challenge be set by the teacher? The only way in which the teacher can identify those children who will be extended by the challege is through observation.
If such a task is used to assess where a child is at, it can also destroy the confidence of that child in the process. (Refer to your possible response to the task of making a chair without having been given opportunities to explore and experiment with the materials and tools beforehand.)

According to Briggs & Potter (1990:100) "physical differences, abilities and children's past experiences vary so enormously that common sense decrees that we cannot and should not attempt to teach all children the same things at the same time in the same way". It is only through careful observations of the actual developmental level of a child that a teacher can, with appropriate guidance, lead a child to his or her potential development. It is the distance involved in moving a child from actual development to their potential, which is described by Vygotsky as the *Zone of Proximal Development*. According to MacInerney & MacInerney (1994), "a teacher's task is to place learning within this zone". To achieve this, it is a self evident truth that the teacher must first establish the actual developmental level. Gage & Berliner (1986:126)) claim that "educators need to make a special effort to understand the child's mental operations, to see phenomena and problems in the way the child sees them". Though they do admit that "this kind of intellectual empathy is not easy", they maintain that it can be achieved through interviews and observations.

Vygotsky suggested three processes which could help a teacher place learning within the zone of proximal development.

1. Establish the level of difficulty. This level, assumed to be at the proximal level, must be challenging, but not too difficult.

2. Provide assisted performance, This is referred to as the scaffolded instruction. The adult provides guided practice to the child with a clear sense of the goal or outcome of the child's performance. As with scaffolding arounda building, it is gradually removed so that the child can perform the task independently.

3. Evaluate the independent performance of the child on the task. If the learning experience has been carefully structured and situated within the child's zone of proximal development, the child should be able to perform the task independently.

We are suggesting that the task of making the sun hat is problematic, not only because of the inappropriateness of the materials for the task and lack of attention to the children's control over any tools required, the somewhat sophisticated task itself appears to be being used to gauge the actual developmental level of the children. That may be appropriate for some, but not all.

A MORE APPROPRIATE TECHNOLOGY CURRICULUM FOR EARLY CHILDHOOD

We promote the idea that an individual works through a number of phases when engaged in the creative process. It is important, when working with children, for teachers to relate all ideas to the work of adult makers and to draw parallels with other creative disciplines such as composing a piece of music or writing a piece of prose or

poetry. We maintain that there are three main phases of engagement. The first phase relates to the exploration of the medium. Children should be introduced to the material which is the focus of the learning experience. The teacher must provide an appropriate and safe working environment in which the children can operate confidently. The teacher should demonstrate the specific techniques which are required to control the medium and any tools normally used to manipulate and/or modify the material. The techniques usually involve the use of tools or equipment, so it is necessary to discuss the correct methods of using the tools and how to care for them. This act of demonstration by the teacher or an experienced peer should be an essential part of the learning process. The learners can then be encouraged to 'have a go' at the process without any requirement, during this phase, to make a finished piece.

The learning environment needs to be stimulating, secure and supportive of the efforts of the learners. During the first phase, the emphasis should be on controlling the medium, becoming confident in using the tools and becoming familiar with the physical and aesthetic qualities of the medium. The children must understand that a wide range of different responses to the learning challege is both possible and expected. They should also be made aware that differences in interpretation are possible from individual children. Sometimes during the process of exploration and experimentation, accidental effects are achieved with the medium. When this happens , it is important for the teacher to challenge the children to control the effect and to repeat it so that if they require that effect in a future piece they will know how to achieve it.

The second phase allows for the development and refinement of the concepts and techniques. The children can be challenged by the teacher with a specific motivational starting point. It is essential that the learning challenge relates well to the physical and aesthetic properties of the technique and medium previously introduced and explored. The focus should be quite specific. For example, if the technique was to do with clay, then the starting point would feature the three dimensional and possibly the textural qualities which were a focus of the experiments. During this phase, the technical skills of the children develop and the medium is controlled for expressive purposes. It is expected that there will be a completed object made during this phase. Often there will be some dialogue to share ideas and knowledge between the learners and between teacher and the learners. Modifications and developments of ideas and techniques are also often made during this phase of the learning process. Sometimes it is necessary for the teacher to repeat a demonstration if individual students experience technical difficulties with the medium or the tools required to manipulate the medium.

The third phase relates to the development of autonomy by the learners. During this phase, the children identify their own challenges and work through the process creatively using the skills and knowledge about the various media and equipment they have gained during the earlier phases. Gradually the range of media available to the children is expanded and their confidence in the use of a range of tools and associated equipment is developed.

It is essential that teachers place an emphasis on their responsibility of making their expectations of the children very clear. It is essential that the children see the point of the learinmg experience in which they are engaged. The teacher must convey to each of them a confidence in their potential to ultimately be successful in whatever technique they are trying to master.

Children must know that the work which they produce is respected by the adults and peers in their school and home environment.

Conclusion

As one of the eight key learning areas of the National Curriculum, Technology has the potential to help children develop in a whole range of ways as does Technology Educacion if it is used correctly. There still seems to be some confusion about the role of each of these aspects of the curriculum. For example, the flier for this conference seems to focus on that aspect of technology which is specifically associated with communication and the media. In an issue of Art Education devoted to art and technology most of the contributers were concerned with the place and function of computer technology on the curriculum. For example:

... I can see technology for what it is ... I can use it to do certain tasks faster and more efficiently than I could do them without it. I can use it as a tool to enhance my abilities and give me the time to do other things ... when properly applied it will provide the potential for unlimited exploration into areas we haven't even dreamed of. (Munoz,1993, 49)

On the other hand, the National Curriculum profiles tend to see computer education and information technology as part of a broader context which encompasses Design and Technology

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